

## CLAIMS

What is claimed is:

1           1.       A method, comprising:  
2               determining, by a device that shares an upstream channel with other devices,  
3       whether based, at least in part on particular data, an upstream channel data transfer rate  
4       can be improved over a current data transfer rate of a current upstream channel from the  
5       device to a remote system; and  
6               improving by the device, if the upstream channel data transfer rate can be  
7       improved, the upstream channel data transfer rate based, at least in part, on the particular  
8       data.

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1           2.       The method of claim 1, wherein the device that shares the upstream  
2       channel with other devices comprises a cable modem.

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1           3.       The method of claim 2, wherein the remote system comprises a cable  
2       modem termination system (CMTS).

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1           4.       The method of claim 2, wherein the particular data comprises cable  
2       modem transmit queue capacity data.

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1           5.       The method of claim 4, wherein determining whether the upstream  
2       channel data transfer rate can be improved comprises determining whether the transmit  
3       queue capacity data indicates that the transmit queue is full.

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1           6.       The method of claim 5, wherein improving by the cable modem the  
2 upstream channel data transfer rate based, at least in part, on the particular data  
3 comprises:  
4           if the transmit queue capacity data indicates that the transmit queue is full:  
5                 determining whether a capacity of the transmit queue is at a maximum  
6           capacity; and  
7                 increasing the capacity of the transmit queue, if the capacity is not at the  
8           maximum capacity.

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1           7.       The method of claim 5, wherein improving by the cable modem the  
2 upstream channel data transfer rate based, at least in part, on the particular data  
3 comprises:  
4           if the transmit queue capacity data indicates that the transmit queue is full:  
5                 determining whether a capacity of the transmit queue is at a maximum  
6           capacity; and  
7                 initiating a service flow, if the capacity of the transmit queue is at the  
8           maximum capacity.

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1           8.       The method of claim 3, wherein the particular data comprises upstream  
2 channel bandwidth data transmitted from the CMTS.

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1           9.       The method of claim 8, wherein the bandwidth data comprises an  
2 upstream channel descriptor (UCD) message and an upstream bandwidth allocation map  
3 (MAP) message.

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1           10.      The method of claim 9, wherein determining whether the upstream  
2 channel data transfer rate can be improved comprises:  
3           receiving the UCD message from the CMTS for each upstream channel, including  
4 the current upstream channel the cable modem is using;  
5           receiving the MAP message from the CMTS for each upstream channel;  
6           calculating an available bandwidth of each upstream channel based, at least in  
7 part, on the UCD message and the MAP message; and  
8           determining whether a different upstream channel has more bandwidth than the  
9 current upstream channel.

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1           11.      The method of claim 10, wherein improving by the cable modem the  
2 upstream channel data transfer rate based, at least in part, on the particular data comprises  
3 switching to the different upstream channel, if the different upstream channel has more  
4 available bandwidth than the current upstream channel.

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1           12.      An article of manufacture comprising:  
2           a machine-accessible medium including thereon sequences of instructions that,  
3 when executed, cause a device that shares an upstream channel with other devices to:

4           determine whether based, at least in part on particular data, an upstream channel  
5   data transfer rate can be improved over a current data transfer rate of a current upstream  
6   channel from the device to a remote system; and

7           improve, if the upstream channel data transfer rate can be improved, the upstream  
8   channel data transfer rate based, at least in part, on the particular data.

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1           13.    The article of manufacture of claim 12, wherein the device that shares the  
2   upstream channel with other devices comprises a cable modem.

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1           14.    The article of manufacture of claim 13, wherein the remote system  
2   comprises a cable modem termination system (CMTS).

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1           15.    The article of manufacture of claim 13, wherein the particular data  
2   comprises cable modem transmit queue capacity data.

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1           16.    The article of manufacture of claim 15, wherein the sequences of  
2   instructions that, when executed, cause the device to determine whether the upstream  
3   channel data transfer rate can be improved comprise sequences of instructions that, when  
4   executed, cause the device to determine whether the transmit queue capacity data  
5   indicates that the transmit queue is full.

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1           17.    The article of manufacture of claim 16, wherein the sequences of  
2   instructions that, when executed, cause the device to improve by the device the upstream

3 channel data transfer rate based, at least in part, on the particular data comprise sequences  
4 of instructions that, when executed, cause the device to:

5 if the transmit queue capacity data indicates that the transmit queue is full:

6 determine whether a capacity of the transmit queue is at a maximum  
7 capacity; and

8 increase the capacity of the transmit queue, if the capacity is not at the  
9 maximum capacity.

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1 18. The article of manufacture of claim 16, wherein the sequences of  
2 instructions that, when executed, cause the device to improve by the device the upstream  
3 channel data transfer rate based, at least in part, on the particular data comprise sequences  
4 of instructions that, when executed, cause the device to:

5 if the transmit queue capacity data indicates that the transmit queue is full:

6 determine whether a capacity of the transmit queue is at a maximum  
7 capacity; and

8 initiate a service flow, if the capacity of the transmit queue is at the  
9 maximum capacity.

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1 19. The article of manufacture of claim 14, wherein the particular data  
2 comprises upstream channel bandwidth data transmitted from the CMTS.

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1           20.     The article of manufacture of claim 19, wherein the bandwidth data  
2     comprises an upstream channel descriptor (UCD) message and an upstream bandwidth  
3     allocation map (MAP) message.

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1           21.     The article of manufacture of claim 16, wherein the sequences of  
2     instructions that, when executed, cause the device to determine whether the upstream  
3     channel data transfer rate can be improved comprise sequences of instructions that, when  
4     executed, cause the device to:

5           receive the UCD message from the CMTS for each upstream channel, including  
6     the current upstream channel the cable modem is using;

7           receive the MAP message from the CMTS for each upstream channel;

8           calculate an available bandwidth of each upstream channel based, at least in part,  
9     on the UCD message and the MAP message; and

10          determine whether a different channel has more bandwidth than the current  
11     upstream channel.

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1           22.     The article of manufacture of claim 21, wherein the sequences of  
2     instructions that, when executed, cause the device to improve the upstream channel data  
3     transfer rate based, at least in part, on the particular data comprise sequences of  
4     instructions that, when executed, cause the device to switch to the different upstream  
5     channel, if the different upstream channel has more available bandwidth than the current  
6     upstream channel.

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1           23.     An apparatus, comprising:

2                 an improvement determination unit (IDU), to determine, based at least in part on  
3     particular data, whether an upstream channel data transfer rate can be improved over a  
4     current data transfer rate of a current upstream channel to a remote system; and

5                 an improvement unit, coupled with the IDU, to improve, if the upstream channel  
6     data transfer rate can be improved, the upstream channel data transfer rate based, at least  
7     in part, on the particular data.

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1           24.     The apparatus of claim 23, wherein the particular data comprises cable  
2     modem transmit queue capacity data.

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1           25.     The apparatus of claim 24, wherein the particular data comprises upstream  
2     channel bandwidth data transmitted from the CMTS.

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2           26.     A system, comprising:  
3                 a cable modem termination system, to transmit and receive data packets;  
4                 customer premise equipment (CPE), to receive the data packets from the CMTS  
5     and transmit the data packets to the CMTS;  
6                 a cable modem, coupled with the CMTS and the CPE, to determine whether,  
7     based at least in part on particular data, an upstream channel data transfer rate can be  
8     improved over a current data transfer rate of a current upstream channel from the cable  
9     modem to the CMTS, and improve, if the upstream channel data rate can be improved,  
10    the upstream channel data transfer rate based, at least in part, on the particular data; and

11 a coaxial cable, to couple the cable modem with the CMTS and transmit the data  
12 packets between the cable modem and the CMTS.

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1 27. The system of claim 26, wherein the cable modem is integrated with the  
2 CPE.

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1 28. The system of claim 26, wherein the particular data comprises cable  
2 modem transmit queue capacity data.

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1 29. The system of claim 26, wherein the particular data comprises upstream  
2 channel bandwidth data transmitted from the CMTS.

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